

**Abstract of the Disclosure**

An electrochemical converter is disposed within a pressure vessel  
5 that collects hot exhaust gases generated by the converter for delivery to a  
cogeneration bottoming device, such as a gas turbine. The bottoming device  
extracts energy from the waste heat generated by the converter, such as a fuel  
cell for the generation of electricity, yielding an improved efficiency energy  
system. Bottoming devices can include, for example, a gas turbine system or an  
10 heating, ventilation or cooling (HVAC) system. The pressure vessel can include  
a heat exchanger, such as a cooling jacket, for cooling the pressure vessel and/or  
preheating an input reactant to the electrochemical converter prior to introduction  
of the reactant to the converter. In one embodiment, a compressor of a gas  
turbine system assembly draws an input reactant through the pressure vessel heat  
15 exchanger and delivers the reactant under pressure to a fuel cell enclosed therein.  
Pressurized and heated fuel cell exhaust gases are collected by the pressure  
vessel and delivered to the turbine system expander. The fuel cell and the  
pressure vessel function as the combustor of the gas turbine assembly. The  
expander can perform mechanical work, or can be coupled to a generator to  
20 provide electrical energy in addition to that provided by the fuel cell. Also  
disclosed is a feedthrough for transferring a fluid, such as exhaust gases or an  
input reactant, from outside the pressure vessel to within the pressure vessel.